cation between the parting material and the outside of the laminate. (It will be understood that in the several forms of the invention shown herein, any given layer which is shown as a single layer for clarity may in fact be formed by plying up any desired number of thin sheets made by calendering or the like, to produce a desired thickness.) Again, the laminate in a heated condition is disposed between mold members **48**, **49** (FIG. 10) and application of fluid pressure through the tube **45** causes the material to take the shape of an enlarged portion **50** of the mold, thereby forming a bulge **51** in the expanded and solid layers on one side of the laminate and producing a corresponding hollow space **52** in the interior.

Considering now the form of the invention referred to previously in which an internal bracing member is provided to give a kind of reinforcing beam effect, there may be provided, as shown in FIG. 11, a laminate of upper and lower solid layers **55**, **56** and blown plastic layers **57**, **58**, heat and pressure laminated together as described previously. In this case adhesion of the layers is prevented at selected areas represented by non-adhering parting sheets **59**, **60**. The parting sheets partially overlap a strip **61** of rigid solid plastic, which may be the same as the outer plastic layers **55**, **56**, or at least is of a plastic compatible with (adherent to) the expanded plastic layers **57**, **58**. One parting sheet **59** covers a portion **62** of the lower face of the interposed plastic strip but leaves a marginal portion **63** of such lower face exposed. The other parting sheet **60** covers a portion **64** of the upper face of the plastic strip but leaves a marginal portion **65** of such upper face exposed. The exposed opposite faces **63**, **65** of the plastic strip are located toward opposite edges of the plastic strip; there is a medial zone **66** of the plastic strip which is covered by the parting sheets on both faces so that both faces of the plastic strip are free from attachment at this zone. A tube **68** can extend from the parting means to the outside of the laminate. It will be understood, that, as previously, the various parts of the laminate are assembled and subjected to heat and pressure, resulting in adhesion of the layers everywhere except where prevented from adhering by the parting sheets.

The laminate, in a heated, plastic condition, is disposed between mold halves **70**, **71** (FIG. 13), having upper and lower enlarged cavities, **72**, **73** corresponding to the projected area of the parting sheets **59**, **60**. Introduction of fluid pressure through the tube **68** causes the layers of the laminate to flow into the shape of the cavities, as indicated in FIG. 14, thus forming bulges **74**, **75** and a corresponding interior hollow **76**. By reason of the partial overlapping of the non-adhering parting sheets **59**, **60** with the interposed plastic strip **61**, only a portion **63** of the lower surface of the plastic strip at one end and only a portion **65** of the plastic strip at the other end adheres to the inner surfaces of the foamed plastic layers **57**, **58**, while the medial zone **66** of the plastic strip remains nonadherent. As a consequence, such medial zone **66** takes the form, in the expansion step of a rigid transverse bracing member, connected to the upper and lower foamed layers at each end. Such internal bracing member gives unusual rigidity to the laminate and greatly increases its load bearing capacity while not adding appreciably to the weight. It will be understood of course that this form of the invention is applicable as well to laminate made entirely of solid plastic layers rather than partly of foamed plastic layers, and that as many transverse members as desired, located and shaped as desired, may be embodied either in hollow sections bulging from one side or the other of the laminate, or from both sides.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A method of making a laminate of rigid thermoplastic heat-formable sheet material comprising providing at least two sheets of such rigid thermoplastic material, placing on a surface of one such sheet at a preselected area a layer of parting material, disposing an air-conducting means on the sheet leading from the parting material to the edge of the sheet, assembling the two thermoplastic sheets in face-to-face relationship with the parting material and air-conducting means sandwiched between the thermoplastic sheets, applying heat and pressure to unite the thermoplastic sheets together at their contacting faces, heating the resulting laminate to a temperature at which the thermoplastic material can readily be drawn into a desired shape, disposing the thus-heated laminate between mold members which confine the laminate against outward expansion everywhere except at the area of said parting layer, at which area at least one of the mold members is provided with an enlarged cavity, and applying differential pressure to the heated laminate to produce a thermoplastic deformation of at least one of the thermoplastic sheets at the said area into the shape of said enlarged cavity without producing thermoplastic deformation of the remainder of the laminate, whereby there is formed a hollow section between the thermoplastic sheets at the said parting layer whereby the rigidity of the laminate is increased.

2. A method of making a laminate of thermoplastic heat-formable sheet material comprising providing at least two rigid sheets of such thermoplastic material, disposing between such two sheets a rigid reinforcing strip of thermoplastic material compatible with said two sheets, disposing parting means between said two sheets at a preselected area, said parting means covering all but marginal edge portions on opposite faces at opposite ends of said reinforcing strip, the uncovered portions of the reinforcing strip being in contact with opposed faces of the thermoplastic sheets, subjecting the assembly to heat and pressure to unite the contacting surfaces of the two thermoplastic sheets and the uncovered portions of the reinforcing strip firmly together, disposing the resulting laminate between mold members which clamp the laminate securely at its marginal edge portions and which define an enlarged cavity located correspondingly to the parting means, subjecting the laminate to differential pressure while it is heated to a temperature at which it is readily deformable to form a hollow section within the laminate at said parting means, the said hollow section being bridge by the laid rigid reinforcing strip which extends generally transversely of said hollow section and serves to reinforce the laminate at said hollow section.

References Cited by the Examiner

UNITED STATES PATENTS

1,603,465	10/1926	Hopkinson	156—289 X
1,970,802	8/1934	Johnson	156—145 X
2,345,144	3/1944	Opavsky	264—96
2,466,586	4/1949	Evans	156—221
2,991,500	7/1961	Hagen	264—98 X
3,070,481	12/1962	Schornstheimer	156—292 X
3,149,017	9/1964	Ehrreich et al.	264—94 X
3,161,553	12/1964	Visser	156—156

References Cited by the Applicant

UNITED STATES PATENTS

2,739,093	3/1956	Bull.
3,018,268	1/1962	Daly.
3,026,231	3/1962	Chavannes.
3,039,911	6/1962	Fox.
3,041,220	6/1962	Martin et al.
3,048,514	8/1962	Bentele.
3,070,817	1/1963	Martin et al.
3,080,267	3/1963	Schmalz.

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